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Using the Improvisational "Yes, and..." Approach as a Review Technique in the Student-Centered Biology Classroom †

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INTRODUCTION

Today's generation of students is frequently referred to as the millennial or Net generation of students, a group characterized by a multimodal learning preference with emphasis on learning through inductive and experiential reasoning (5, 10, 13). Often, classroom instruction takes the form of scripted PowerPoint lectures that emphasize instructor-centered learning rather than student-centered learning. As a result, Net students often approach learning in science courses through memorization and struggle to connect concepts across the curriculum. In theatre, this approach is often referred to as the scripted approach, in which every aspect of a theatrical performance is planned by a director without audience input (4). Improvisation is a technique that depends on audience input for topic selection and involves actors in the creative process. Improvisation is regularly brought to business and management classrooms as an engaged learning technique with significant success. Its use in the science classroom, however, has been limited (3, 4, 6–8, 11, 12).

Reported benefits of instruction using improvisational techniques include many attributes in accordance with AAAS's *Vision and Change Report* (1, 2). Specifically, improvisation has been heralded as a way to "foster teamwork and better brainstorming, improve communication and presentation skills, promote creative problem solving…, and increase comfort level with change and willingness to take risks," characteristics required in science careers our students will be pursuing (4, 12). Improvisational techniques have been successfully used in The Fuqua School of Business at Duke University as part of their MBA program and with first-year medical students to illustrate physician-patient interactions but has yet to be brought into the undergraduate classroom (4, 9).

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Here we present a variation of the improvisational technique, "Yes, and…" as an in-class review method. This technique was piloted at three different primarily undergraduate institutions in cell biology courses as a way to review and integrate major concepts covered in class. We find that this technique fosters integration of concepts across the curriculum, promotes peer-to-peer interaction, encourages students to "talk" science, and complements more traditional engaged learning techniques including Think-Pair-Share, concept mapping, and the Socratic method.

PROCEDURE

The "Yes, and…" technique was assessed to be in compliance with institutional review board and informed consent protocols at each of the three pilot institutions (Hastings College, High Point University, and Hendrix College) and federal guidelines.

Lower enrollment courses (fewer than 15 to 25 students)

The "Yes, and…" technique was implemented in two upper-level lower-enrollment cell biology courses. At Hastings College, the activity was implemented as a unit review activity. In the first unit review, the instructor began the "Yes, and…" technique by providing the topic and an initial statement. Each student in the class contributed an additional statement to the narrative. The technique was continued throughout the semester after each unit as a way to review and connect topics across the course. At High Point University, the instructor used the technique as a class review. The instructor started by contributing a very broad statement that students built on by raising their hand and contributing additional sentences. Students were instructed to start with broad statements and continue with more detailed statements. At both institutions, initial implementations of the exercise were done as a class, and subsequent activities were completed in groups of three or four students.

Higher enrollment courses (40 to 50 students)

The "Yes, and..." technique was piloted as a final semester review activity in a higher enrollment (40 to 50 students) introductory cell biology course at Hendrix College. Students were provided with a list of biological themes (Table 1). The instructor provided an initial statement about a theme and the technique was modeled with four to five additional students in class to demonstrate it as described above. After the initial demonstration, students separated into small groups, and the "Yes, and…" technique proceeded in each group similarly, with one student starting the narrative of the topic and continuing with subsequent student comments. Students were also provided with a word bank and instructions to help them remember important concepts throughout the semester (Appendix 1). Each student group elected a secretary responsible for compiling discussion notes (Appendix 2). Additionally, students provided feedback on the technique as a review method (Appendix 3).

Helpful tips for implementation. Instructors are encouraged to provide 30 minutes or more for the "Yes, and…" technique. Whole class modeling of the "Yes, and…" technique is suggested to initially demonstrate this activity. However students tended to feel more comfortable participating in smaller groups. We found that fostering an interactive classroom from the beginning of the semester aided in the success of this activity. Explaining the value of speaking about science as it relates to deep understanding of biology was also positively received by students. This activity is amenable to a wide range of biological topics, and instructors are encouraged to tailor the discussion prompts to fit topic specificity or the needs of the review session. Example prompts and instructional handouts provided to the students are included in Supplementary Document 1. Instructional tips and anticipated challenges depending on review application, course level, and class size are provided in Appendix 4.

There are no safety issues associated with this activity.

TABLE 1.
Topics and themes used for discussion.

New properties emerge at successive levels of biological organization.
Life requires the transfer and transformation of energy and matter.
Life's processes involve the expression and transmission of genetic information.
From ecosystems to molecules, interactions are important in biological systems.
Evolution accounts for the unity and diversity of life.

CONCLUSION

Here we describe the "Yes, and…" improvisational technique as a teaching method to review course material and encourage students to verbally communicate their understanding of cell biology. Once acquainted with the technique through instructor modeling, students were able to articulate their general understanding of course material and could also relate topics to broad themes in the course. One strength of the "Yes, and…" technique is its versatility of use across class size and composition. The "Yes, and…" technique could easily be implemented in any biology discipline (cell biology, microbiology, virology, genetics, zoology, evolution, or ecology) and at any level (introductory or advanced). We also found that the technique was adaptable regardless of the review application and can be implemented as a single class review, as a unit review, or as a semester review.

Each of the three instructors who implemented the activity felt the students were able to use the technique to link concepts across their individual courses. Instructors found that discussions started with one topic in cell biology, and then progressed to topics typically dissociated from one another from a student perspective (homeostasis to Gibb's free energy for example). Additionally, instructors found the technique to be a helpful way to quickly assess and correct student misconceptions, suggesting this technique could be a mechanism of formative assessment. Student feedback about the technique was generally positive (Appendix 3). Specifically, students found the strengths of the "Yes, and…" technique to be that it helped review different topics and assisted in providing context across the curriculum. In general, students felt the technique helped them link apparently different topics together, providing unifying themes in the course. Students also appreciated the opportunity to work in small groups with their peers and felt it was helpful to bounce ideas off of one another and hear different perspectives. Students expressed enthusiasm and surprise at their ability to recall information throughout the semester.

Collectively, we found the "Yes, and…" improvisational technique to be a novel, adaptable technique for assisting in course review. Our successful implementation of the "Yes, and…" technique suggests improvisational techniques deserve a closer look as a mechanism of engaged learning and have potential as a means of interacting with the millennial generation of students.

SUPPLEMENTAL MATERIALS

Appendix 1: Instructional handouts for students
Appendix 2: Student discussion notes for semester review topics
Appendix 3: Student feedback from three pilot institutions
Appendix 4: Instructional tips depending on course context

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REFERENCES

1. **American Association for the Advancement of Science.** 2009. Vision and change in undergraduate biology education: a call to action: a summary of recommendations made at a national conference organized by the American Association for the Advancement of Science, July 15–17, 2009. Washington, DC.
2. **American Association for the Advancement of Science.** 2015. Vision and change in undergraduate biology education: chronicling change, inspiring the future. AAAS, Washington, DC.
3. **Bergren, M., M. Cox, and J. Detmar.** 2002. Improvise this! How to think on your feet so you don't fall on your face. Hyperion, New York, NY.
4. **Berk, R. A., and R. H. Trieber.** 2009. Whose classroom is it anyway? Improvisation as a teaching tool. J. Excel. Coll. Teach. **20**:29–60.
5. **Carlson, S.** 2005. The Net generation goes to college. Chron. High. Edu. **52**:A34.
6. **Crossan, M. M.** 1998. Improvisation in action. Organizat. Sci. **9**:593–598.
7. **Crossan, M. M., M. P. Cunha, D. Vera, and O. Cunnha.** 2005. Time and organizational improvisation. Acad. Mgmt. Rev. **30**:129–145.
8. **Cunha, M. P., J. V. Cunha, and K. Kamoche.** 1999. Organizational improvisation: what, when, how, and why. Internatl. J. Mgmt. Rev. **1**:299–341.
9. **Hoffman, A., B. Utley, and D. Ciccarone.** 2008. Improving medical student communication skills through improvisational theatre. Med. Educ. **35**:225–231.
10. **Jenkins, H.** 2006. Convergence culture: where old and new media collide. New York University Press, New York, NY.
11. **Moshavi, D.** 2001. "Yes, and…": introducing improvisational theatre techniques to the management classroom. J. Mgmt. Educ. **25**:437–449.
12. **Segarra, V. A., S. Pulford, and S. Walsh.** 2013. Presenting fake figures: a tool to effectively teach effective scientific figure design. J. Microbiol. Biol. Educ. **14**(2):260–262.
13. **Tapscott, D.** 2009. Growing up digital: how the Net generation is changing your world. McGraw-Hill, New York, NY.